

Calculus Warm Up # 8-4

1. An experimental population of fruit flies is growing exponentially. There are 100 flies after day 2 of the experiment and 300 after day 4. How many were in the original population?

2. Money is deposited in an account where interest is compounded continuously. If the balance doubles in 6 years, what is the annual percentage rate?

HW Questions: p. 415

In Exercises 39–56, find the indefinite integral.

39. $\int \frac{1}{7x - 2} dx$

41. $\int \frac{1/x}{\ln(3x)} dx$

$$u = \ln(3x)$$

$$du = \frac{1}{3x} dx$$

43. $\int \frac{x^2 + 3}{x} dx$

45. $\int \frac{x^2}{x^3 - 1} dx$

$$47. \int \frac{1}{x\sqrt{\ln x}} dx$$

$$49. \int xe^{-3x^2} dx$$

$$51. \int \frac{e^{4x} - e^{2x} + 1}{e^x} dx$$

$$= \int (e^{3x} - e^x + \frac{1}{e^x}) dx$$

then split them up.

$$53. \int \frac{e^x}{e^x - 1} dx$$

$$55. \int xe^{-x^2/2} dx$$

In Exercises 57–60, evaluate the definite integral.

57. $\int_1^4 \frac{x+1}{x} dx$

59. $\int_3^4 \frac{1}{x-2} dx - \int_3^4 \frac{1}{x+2} dx$

In Exercises 61 and 62, sketch the graph of the region whose area is given by the integral, and find the area.

61. $\int_0^2 4e^{-2x} dx$

In Exercises 63 and 64, find the average value of the function over the given interval. Find the values of x where the function assumes its mean value and sketch the graph of the function.

Function	Interval
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63. $f(x) = \frac{1}{x-1}$	[5, 10]
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$$\frac{1}{10-5} \int_5^{10} \frac{1}{x-1} dx$$

$$f(c) = \frac{1}{b-a} \int_a^b f(x) dx$$

In Exercises 65 and 66, find the area of the region bounded by the graphs of the equations.

65. $y = xe^{-x^2}$, $y = 0$, $x = 0$, $x = 4$

Classwork Ch. 7 review

Name:

Evaluate the integral

1. $\int \frac{x}{x^2 - 1} dx$

2. $\int \frac{\ln \sqrt{x}}{x} dx$

3. $\int \frac{x^3 + 1}{x^2} dx$

4. $\int \left(x + \frac{1}{x}\right)^2 dx$

5. $\int \frac{x+2}{2x+3} dx$

$$\frac{x}{2} + \frac{1}{4} \ln|2x+3| + C$$

6. $\int \frac{e^{1/x}}{x^2} dx$

$$-e^{1/x} + C$$

7. $\int \frac{e^{2x} - e^{-2x}}{e^{2x} + e^{-2x}} dx$

$$\frac{1}{2} \ln(e^{2x} + e^{-2x}) + C$$

8. $\int x^2 e^{x^3+1} dx$

$$\frac{e^{x^3+1}}{3} + C$$

9. $\int \frac{x-1}{3x^2-6x-1} dx$

$$\rightarrow \frac{1}{6} \ln|3x^2-6x-1| + C$$

Classwork:

Calculus B Review # 2

Name: _____

1. $\int \frac{2x-1}{x^2-x+4} dx =$

$$\ln|x^2-x+4| + C$$

2. $\int \frac{x}{(x^2+2)^2} dx =$

$$-\frac{1}{2(x^2+2)} + C$$

3. $\int \frac{e^x - e^{-x}}{e^x} dx =$

$$x + \frac{e^{-2x}}{2} + C$$

4. $\int \frac{x^2+x}{x-1} dx =$

$$\frac{x^2}{2} + 2x + 2 \ln|x-1| + C$$

5. $\int_0^1 (x^2 + 1)^2 dx =$

$$\frac{28}{15}$$

6. Use a left Riemann sum with $n = 4$ equal subintervals to approximate

$$\int_0^2 \sqrt{x} dx.$$

$$A \approx 1.466$$

7. Use the trapezoidal rule with $n = 4$ to approximate $\int_0^8 2x^3 dx$.

$$2176$$

8. Find the average value of

$$f(x) = 2x^2 \text{ on } [2, 4].$$

$$\frac{56}{3}$$

9. Find the work needed to stretch a spring 1 foot if it takes a force of 4 pounds to stretch the same spring nine inches from its natural length.

$$4 = k(9)$$

$$32 \text{ in} \cdot \text{lbs}$$

$$\int_0^{12}$$

10. Find the work needed to empty a right cone with a height 12 feet and a diameter of 4 feet, out the top. The base of the cone is on top and the cone is filled with water, density 62.4 lb/ft^3 .

$$2995.2 \pi \text{ ft} \cdot \text{lbs}$$

11. Find the fluid force on a vertical circular object with radius 3 feet that is centered 12 feet below the water surface. (Set up integral, then calculate.)

21171.82

12. For the region enclosed by the functions $f(x) = x^2$ and $f(x) = x^3$ Set up the integral, then calculate the area.

1/2

13. Find the volume of the object obtained from the area in question 12 being rotated about the line $x = 5$.

HW: Finish classwork
Pink and Green WS

Friday: Group Event
Ch. 7 Applications
(counts as classwork)